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ABSTRACT

Holt, Rinehart and Winston (School Department) sought to investigate the effectiveness of the Holt School Mathematics 1978 program in developing student achievement growth in mathematics. A field study during the 1977-1978 school year involved assessing teacher and student reactions and pre/post analysis of achievement. Results include: teachers agree that the 3-part approach (display-development-drill) is effective; students generally understand the program material after teacher instruction and exercise practice; and students have demonstrated a large gain to higher national quantities on post-tests. (MP)

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A Field Research Study of The Holt School Mathematics Program (1977-1978)

SE 026 504

HOLT, RINEHART AND WINSTON

A Field Research Study

of

The HOLT SCHOOL MATHEMATICS Program

(1977-1978)

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Dear Educator:

We are pleased with the contents of this report for two reasons. First, the report supports our intention and expectation that the Holt School Mathematics program contributes to successful mathematics instruction. Second, I believe that we have made considerable progress in designing instruments that provide us with more specific information. It is thus possible for our authors and editors to continue to refine the program better to meet the needs of our students.

While we at Holt seek to improve our methods in collecting, analyzing and utilizing information from teachers and students, we realize that instructional materials are only one factor in the total educational process. A child's ultimate success is tied to home and parental influences, to the total school and classroom environment, to the child's own commitment and to the professionalism of the teacher, as well as to instructional materials.

We very much appreciate the time and effort expended by the cooperating schools that participated in the 1977-1978 research. In the coming year, we look forward to wider interation with an even greater number of schools that share our ultimate goal of contributing to more successful learning experiences for our young people.

Sincerely,

Thomas J. Murphy

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METHODOLOGY AND SUMMARY OF FINDINGS

Research Report: The HOLT SCHOOL MATHEMATICS (HSM)
Field Study (1977-1978)
METHODOLOGY AND SUMMARY OF FINDINGS

I. Statement of Purpose/Methodology:

Holt, Rinehart and Winston (School Department) sought to investigate the effectiveness of the HOLT SCHOOL MATHEMATICS © 1978 program in developing student achievement growth in mathematics. To further this aim, a field study was conducted by Holt during the 1977-1978 school year which involved the following objectives and design:

Objective One: To assess the effectiveness of the HSM program in a variety of school settings.

Design:

1. School sites were selected with consideration of such variables as geographic region, type of school community, total school population, grade levels (i.e. kindergarten through the eighth grade), and estimated family income of students.[1]
2. Demographic data was collected for all school sites.

Objective Two: To assess the judgments and ideas of the participating teachers in regard to mathematics methodology and the design and content of the HSM program.

Design:

1. A questionnaire was developed for teachers which required reaction to items which emphasized mathematics methodology and the design and content of the HSM program.
2. Differences in teachers' judgments and ideas were assessed by considering the moderator variable of grade assignment level.[2]

Objective Three: To assess the judgments and ideas of the participating students in regard to the design and content of the HSM program.[3]

Design:

1. Questionnaires were developed for students which required reaction to items emphasizing the design and content of the HSM program. Differences in student judgment and ideas were assessed by considering the moderator variable of student grade level.

[1] The estimated family income of students was in accordance with the 1977 report of the U.S. Department of Commerce-Bureau of the Census.

[2] All questionnaire data was processed by Data Tab Inc., New York, New York.

[3] On-site interviews were addressed to students employing Levels 2, 4 and 7 of the HSM program.

Objective Four: To assess the HSM program's effects on students' mathematics achievement.

Design:

1. In order to evaluate student achievement on specific mathematics objectives, the Diagnostic Mathematics Inventory (DMI) © 1975, 1977-CTB/McGraw-Hill was selected for the HSM Field Study.[4] In the development of this criterion-referenced test, scores on the DMI were correlated with scores on the California Achievement Test, Form C, which was administered along with the DMI to a national norm group. Hence, estimated normative scores can be generated from students' DMI scores.

2. The DMI was administered to students participating in the HSM Field Study in October, 1977 (pre-test session) and May, 1978 (post-test session). Pre and post national quartile distributions and mean grade equivalency scores assessed students' achievement in computation and concepts and applications in mathematics.

II. Summary of Findings:

Some 54 schools throughout the country participated in most, if not all, of the phases of the HOLT SCHOOL MATHEMATICS Field Study (1977-1978). In rank order, the school sites are thus represented by national geographic region: Midwestern Region (n=18), Western Region (n=13), Eastern Region (n=12), Pacific Region (n=8) and Atlantic Region (n=3).[5]

The following is a summary of the findings of these phases:

A. Teacher Reaction to the HSM program.

(There were 181 teachers who participated in the survey.)

1. The teachers agree that the 3-part approach of the HSM lessons (Display-Development-Drill) is effective with their students.

2. The teachers indicate that all the general features of the HSM program are "Good" to "Very Good." The features receiving the highest ratings include: attractiveness of the text, ease of use, material racially and sexually balanced, maintenance of skills and reading levels.

3. The teachers report that all special features of the teacher and pupil editions are very valuable to of moderate value. The features of the teacher's edition which received the highest ratings include: chapter and lesson commentary objectives, and chapter objectives keyed to test items. The features of the pupil's edition which received the highest ratings include: practice exercises, "Keeping Fit/Tuning Up," chapter review and chapter tests, and "Check-Ups."

[4] Tabulation of scores was conducted by CTB/McGraw-Hill, Monterey, California.

[5] In this study, the *Midwestern Region* included the states of Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin, and North Dakota. The *Western Region* included the states of Colorado, Iowa, and Kansas. The *Eastern Region* included the states of Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York and Pennsylvania. The *Pacific Region* included the states of Arizona, Idaho, Nevada, Utah and Washington. The *Atlantic Region* included the state of Georgia.

4. In general, across grade assignment, teachers indicate that the amount of practice is "adequate" and the level of difficulty is "appropriate" for every listed topic.

B. Student On-Site Interviews.

(There were 339 students who participated in the on-site interviews. These students were using Levels 2, 4 and 7 of the HSM program.)

1. Across grade level, the students strongly report that they generally understand the program material after teacher instruction and exercise practice.

2. With increasing grade level, the students report that they less frequently do the "activity" section of their HSM program.

3. The Level 4 and 7 students report that they do use the chapter reviews and that the reviews do help them to find out which lessons they need to study more.

C. Pre/Post Analysis of Students' Achievement in Mathematics.

(There were 3890 students for whom there were both pre and post-test scores for the *Diagnostic Mathematics Inventory* © 1977 published by CTB/McGraw-Hill.)

After a school year of instruction with the HOLT SCHOOL MATHEMATICS program, students throughout the grade levels demonstrated a large movement to higher national quartiles on the post-administration of the *Diagnostic Mathematics Inventory* (via estimated normative scores).

STUDY PHASE: TEACHER REACTION TO THE HSM PROGRAM

Research Report: The HOLT SCHOOL MATHEMATICS (HSM)
Field Study (1977-1978)
Study Phase: Teacher Reaction to the HSM Program

I. Statement of Purpose/Methodology:

Holt, Rinehart and Winston (School Department) sought to investigate the reactions of teachers to the HOLT SCHOOL MATHEMATICS program © 1978. For this purpose, a questionnaire was designed for teachers which would meet the following objectives:

A. To assess the characteristics of the teacher sample completing the questionnaire, and

B. To assess the judgments of teachers in regard to:

1. The general instructional design and content of the HSM program.

2. Special features of the HSM teacher and pupil editions.

3. The amount of practice and level of difficulty of the HSM program topics.

4. The amount of emphasis specific mathematics applications should receive in the HSM program.

The questionnaire was distributed to teachers who had employed the HSM program © 1978 and who consented to participate in this phase of the HSM Field Study. The moderator variable of "instructor's grade assignment" further differentiated the teachers. In data processing, rating scale items on the questionnaire were statistically analyzed by assessing for each item: frequency, percentage, mean and standard deviation.

II. Results:

A. General School and Teacher Information.

A table of the general school information of participating teachers (Table 1) immediately follows Section II.A.

There were 181 teachers who participated in this phase of the study. In rank order, the teachers are thus represented by national geographic region: Midwestern Region (28%), Eastern Region (26%), Pacific Region (22%), Western Region (19%), and Atlantic Region (5%). Of the 181 respondents, 61 teachers are in the kindergarten through second grade assignment category, 52 teachers are in the third and fourth grade assignment category, 46 teachers are in the fifth and sixth grade assignment category, and 22 teachers are in the seventh and eighth grade assignment category. As a total, 82% of the teachers indicate that their students are on grade level in

TABLE 1a

HSM Field Research Study (1977-1978)

PROFILE OF SCHOOLS PARTICIPATING IN THE TEACHER STUDY PHASE

Geographic Region	Community	School Grades	Total School Population	Estimated Family SES[1]
Eastern	Large City	K-6	900	Low to Middle
Eastern	Large City	K-8	280	Middle
Eastern	Large City	7-8	850	Low to Middle
Eastern	Suburb	6-8	970	Middle
Eastern	Small City	K-5	453	Middle
Eastern	Small City	K-6	210	Low to Middle
Eastern	Small City	5-8	450	Middle
Eastern	Small City	K-6	425	Low to Middle
Eastern	Small City	K-5	650	Middle
Eastern	Rural	6-8	600	Middle
Eastern	Rural	1-5	200	Low to Middle
Atlantic	Suburb	K-5	374	Middle
Atlantic	Suburb	K-5	611	Middle
Atlantic	Suburb	6-8	997	Low to Middle
Midwestern	Suburb	7-9	1171	Low to Upper
Midwestern	Small City	1-6	500	Middle to Upper
Midwestern	Small City	K-8	687	Middle
Midwestern	Small City	K-6	257	Middle
Midwestern	Small City	K-6	300	Low to Middle

[1] Estimated Socio-Economic Background of Family in accordance with the 1977 report of the U.S. Department of Commerce-Bureau of the Census.

TABLE 1b

HSM Field Research Study (1977-1978)

PROFILE OF SCHOOLS PARTICIPATING IN THE TEACHER STUDY PHASE

Geographic Region	Community	School Grades	Total School Population	Estimated Family SES[1]
Midwestern	Small City	K-6	250	Low to Middle
Midwestern	Small City	K-6	360	Low
Midwestern	Small City	K-6	576	Low to Middle
Midwestern	Small City	K-6	300	Low to Middle
Midwestern	Small City	K-6	311	Low to Middle
Midwestern	Small City	K-6	515	Middle to Upper
Midwestern	Small City	K-6	356	Middle
Midwestern	Small City	K-6	176	Low to Middle
Midwestern	Rural	K-4	276	Low to Middle
Western	Large City	K-6	250	Middle
Western	Suburb	K-5	520	Middle to Upper
Western	Suburb	K-6	211	Middle to Upper
Western	Suburb	K-6	654	Middle to Upper
Western	Suburb	7-9	907	Middle to Upper
Western	Small City	4-8	374	Middle to Upper
Western	Small City	4-8	427	Middle
Western	Rural	K-12	990	Middle
Western	Rural	K-4	378	Middle to Upper
Western	Rural	K-12	462	Middle

[1] Estimated Socio-Economic Background of Family in accordance with the 1977 report of the U.S. Department of Commerce-Bureau of the Census.

TABLE 1c

HSM Field Research Study (1977-1978)

PROFILE OF SCHOOLS PARTICIPATING IN
THE TEACHER STUDY PHASE

Geographic Region	Community	School Grades	Total School Population	Estimated Family SES[1]
Pacific	Large City	7-8	1215	Middle to Upper
Pacific	Large City	4-5	393	Low to Middle
Pacific	Large City	K-5	576	Middle to Upper
Pacific	Suburb	7-9	898	Middle
Pacific	Small City	K-5	850	Middle
Pacific	Small City	K-6	450	Middle
Pacific	Small City	K-6	515	Middle to Upper
Pacific	Small City	6-8	455	Low to Middle
Pacific	Small City	K-6	576	Middle to Upper
Pacific	Rural	2-3	300	Middle

[1] Estimated Socio-Economic Background of Family in accordance with the 1977 report of the U.S. Department of Commerce-Bureau of the Census.

mathematics; 8%, above grade level; and 10%, below grade level. The teachers report that they spend, to the nearest minute, a range of 100 minutes (kindergarten teachers) to 253 minutes (fifth grade teachers) on mathematics instruction per week. Across grade level assignment, the teachers indicate that they most commonly instruct their students in mathematics as a whole class (65%). Approximately 32% of the teachers, however, instruct their students in small groups and 14%, individually prescribe instruction to their students.

B. Design and Content of the HSM program.

1. General Instructional Design.

The responses made by the teachers concerning the general instructional design of HSM are reported in Tables 2 through 6. These tables immediately follow Section II.B.1.

The teachers were asked to rate the features of the HSM program on a scale of 5 (Excellent) to 1 (Poor). The teachers indicate that all the general features of the HSM program are "Good" (Scale Value=3) to "Very Good" (Scale Value=4). In rank order these features are:

	Feature	*Total Response Mean*
a.	Overall attractiveness of text	4.21
b.	Ease of use	3.92
c.	Material sexually balanced	3.90
d.	Maintenance of skills	3.86
e.	Material racially balanced	3.85
f.	Reading level	3.77
g.	Diagrams and pictures geared to student maturity level	3.77
h.	Basic facts	3.69
i.	Computational skills (Grades 1-8)	3.68
j.	Diagrams and pictures aid concept development	3.66
k.	Organization of contents	3.64
l.	Math vocabulary	3.64
m.	Provision for different teaching styles	3.59
n.	Student testing program	3.56
o.	Development of concepts	3.53

	Feature	*Total Response Mean*
p.	Provision for individualization	3.51
q.	Problem solving (Grades 1–8)	3.49
r.	Amount of practice	3.37
s.	Metric system	3.00

It should be noted that in comparison with the total response mean, fifth and sixth grade teachers appear to indicate an importantly higher rating for the questionnaire item, "Amount of Practice" than do other grade assignment categories. Seventh and eighth grade teachers appear to indicate an importantly lower rating for the questionnaire item, "Diagrams and pictures aid concept development" than the other grade assignment categories. In addition, there are large standard deviation scores for the items, "Metric System," "Amount of Practice," and "Provision for individualization," which indicates a lack of consensus in teacher evaluation.

The teachers were asked how strongly they agreed or disagreed with statements concerning the HSM program on a scale of 4 (Strongly Agree) to 1 (Strongly Disagree). The teachers across grade assignment categories indicate agreement (Scale Value=3) with the following statements (in rank order):

	Statement	*Total Response Mean*
a.	The size of type used is right for my students,	3.42
b.	On the whole, the text is at an appropriate level for my students,	3.19
c.	The 3-part approach of the lessons (Display-Development-Drill) is effective with my students, and	3.08
d.	More diagnostic tests should be included in the pupil's text.	2.57

It is important to note that the teacher "agreement" that more diagnostic tests should be included in the HSM program is rather weak (53%). Moreover, seventh and eighth grade teachers tend to disagree with this statement (68%).

The teachers report that they disagree (Scale Value=2) with the following statements (in rank order):

	Statement	*Total Response Mean*
a.	Rather than the Chapter Review and Chapter Test in the Pupil's Edition, I would prefer one form in the Pupil's Edition and an alternate form as a secure test in the Teacher's Edition. (Grades 3-8)	2.50
b.	More activity lessons rather than the 3-part approach are needed for non-computational concepts.	2.48
c.	On the whole, the text is too difficult for my students, and	1.60
d.	The size of type is too small for my students.	1.59

Assuredly, the teacher disagreement that they would prefer an alternate evaluation form as a secure test in the teacher's edition is quite weak (54%). Indeed, there is a slight preference by seventh and eighth grade teachers for alternate tests in the teacher's edition (55%). Similarly, the disagreement that they would prefer more activity lessons is weak (56%). There is even a slight preference by teachers of kindergarten through the second grade for more activity lessons (55%).

Teachers of specific grade assignments were asked how strongly they agreed or disagreed with statements concerning mathematics instruction and the HSM program on a scale of 5 (Strongly Agree) to 1 (Strongly Disagree). In addition, teachers were provided with the option to respond "Undecided."

Teachers of *kindergarten* indicate agreement (Scale Value=3) with the following statements, namely (in rank order):

	Statement	*Kindergarten Teacher Response Mean*
a.	The inclusion of counting as far as 20 is appropriate for this level.	3.44
b.	Provisions should be made in the book for writing numerals.	3.33
c.	Counting to numbers greater than 20 should be included, and	3.25
d.	I regularly use the pre-text readiness activities in the front of the Teacher's Edition.	2.88

The kindergarten teachers disagree (Scale Value=2) that "more coloring should be provided" ($\bar{x}$=2.22).

Teachers of *first and second grade* indicate agreement (Scale Value=3) with the following statements (in rank order):

	Statement	*First and Second Grade Teacher Response Mean*
a.	The presentation of mini-problems (short word problems with pictures) is an effective learning aid.	3.43
b.	Grouping to tens helps primary children learn basic facts with sums greater than ten.	3.24
c.	Time should be taught in one block with review throughout the year, and	3.21
d.	Teaching missing addends is an important part of a primary math program.	2.83

There is a large standard deviation score (S=1.05) however, for the statement concerning the instruction of missing addends.

The first and second grade teachers disagree (Scale Value=2) with the following statements (in rank order):

	Statement	*First and Second Grade Teacher Response Mean*
a.	The fraction form $\frac{1}{2}$, $\frac{1}{4}$, etc. should not be taught before grade 2, and	2.41
b.	The addition of two-digit numbers with regrouping should be taught before the addition of two-digit numbers WITHOUT regrouping.	1.95

Teachers of *third and fourth grade* indicate agreement (Scale Value=3) with the following statements (in rank order):

	Statement	*Third and Fourth Grade Teacher Response Mean*
a.	Each chapter should contain word problems based on previously taught skills rather than being limited to the new skills being introduced.	3.48
b.	Time should be taught in one block with review throughout the year.	3.21
c.	Telling time to the nearest minute should be included in grade 3, and	3.17
d.	Flow charts should be introduced at this level.	2.59

In regard to the flow chart questionnaire item, some 36% of the teacher sample state that they are "undecided."

	Statement	*Third and Fourth Grade Teacher Response Mean*
a.	There should be more work with estimating.	2.55
b.	Slides, flips and turns should be taught at this level, and	2.07
c.	Word problems should be based solely on the new skill being introduced in the chapter.	1.89

It is important to note that teacher disagreement that there should be more work with estimating in the HSM program is weak (48%). Moreover, a large percentage of teachers indicate that they are "undecided" concerning this questionnaire item (27%). Many teachers (39%) report that they are "undecided" as well about whether slides, flips and turns should be taught at this level.

TABLE 2a

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content

Questionnaire Item: Please rate the following features of the HSM program.
Scale Values: 5 (Excellent), 4 (Very Good), 3 (Good), 2 (Fair), 1 (Poor).

Feature:[1]	M[2] S	Teacher Total (N=181)	K through 2 Grade Teachers (n=61)	3rd & 4th Grade Teachers (n=52)	5th & 6th Grade Teachers (n=46)	7th & 8th Grade Teachers (n=22)
Organization of Contents (Topic Sequence)	M S	3.64 .96	3.66 .87	3.47 1.05	3.93 .88	3.36 1.00
Development of Concepts	M S	3.53 .91	3.44 .88	3.35 .95	4.00 .74	3.27 .94
Basic Facts	M S	3.69 .99	3.61 .97	3.42 1.02	4.07 1.00	3.77 .75
Maintenance of Skills	M S	3.86 .94	3.63 1.05	3.83 .90	4.11 .83	4.05 .84
Amount of Practice	M S	3.37 1.21	3.10 1.07	3.12 1.25	3.89 1.16	3.59 1.22
Student Testing Program	M S	3.56 .98	3.33 1.03	3.54 .89	4.02 .92	3.19 .87
Math Vocabulary	M S	3.64 .85	3.63 .88	3.46 .78	3.89 .82	3.59 .91
Reading Level	M S	3.77 .87	3.67 .86	3.73 .89	3.93 .83	3.77 .92
Material Racially Balanced	M S	3.85 .82	3.80 .85	3.82 .75	3.98 .77	3.74 1.05
Material Sexually Balanced	M S	3.90 .79	3.85 .76	3.83 .77	4.07 .77	3.84 1.02
Provision for different teaching styles	M S	3.59 .96	3.47 .92	3.48 1.05	3.87 .82	3.59 1.05

[1] Each feature was tabulated for every grade assignment (kindergarten through eighth grade) unless otherwise indicated.
[2] M=Response Mean; S=Standard Deviation.

TABLE 2b

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content

Feature:	M S	Teacher Total (N=181)	K through 2 Grade Teachers (n=61)	3rd & 4th Grade Teachers (n=52)	5th & 6th Grade Teachers (n=46)	7th & 8th Grade Teachers (n=22)
Provision for individualization	M	3.51	3.42	3.57	3.73	3.14
	S	1.05	1.00	1.14	.99	1.04
Diagrams and pictures geared to student maturity level	M	3.77	3.89	3.67	3.91	3.41
	S	.89	.90	.96	.81	.80
Diagrams and pictures aid concept development	M	3.66	3.90	3.49	3.78	3.18
	S	.99	.85	1.21	.81	.96
Overall attractiveness of text	M	4.21	4.25	4.08	4.30	4.23
	S	.86	.83	1.01	.76	.75
Ease of use	M	3.92	3.97	3.61	4.20	3.95
	S	.99	.89	1.23	.69	1.00
Problem solving (grades 1-8)	M	3.49	3.49	3.34	3.83	3.14
	S	.96	.94	.98	.90	.94
Metric System (grades 1-8)	M	3.00	2.92	2.79	3.32	3.05
	S	1.07	1.09	1.06	1.02	1.08
Computational Skills (grades 1-8)	M	3.68	3.56	3.51	3.98	3.76
	S	.89	.81	.99	.73	.94

TABLE 3

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content

Questionnaire Item: How strongly do you agree or disagree with each of the following statements?
Scale Values: 4 (Strongly Agree), 3 (Agree), 2 (Disagree), 1 (Strongly Disagree).

Statement:[1]	M[2] S	Teacher Total (N=181)	K through 2 Grade Teachers (n=16)	3rd & 4th Grade Teachers (n=52)	5th & 6th Grade Tachers (n=46)	7th & 8th Grade Teachers (n=22)
On the whole, the text is at an appropriate level for my students.	M S	3.19 .55	3.18 .56	3.27 .49	3.20 .54	3.05 .65
On the whole, the text is too difficult for my students.	M S	1.60 .57	1.64 .55	1.52 .54	1.61 .54	1.64 .73
The size of the type used is right for my students.	M S	3.42 .52	3.48 .54	3.40 .53	3.39 .49	3.36 .49
The size of type used is too small for my students.	M S	1.59 .57	1.52 .50	1.58 .64	1.70 .55	1.55 .60
The 3-part approach of the lessons (Display-Development-Drill) is effective with my students.	M S	3.08 .58	3.12 .56	2.96 .56	3.13 .58	3.19 .68
More activity lessons rather than the 3-part approach are needed for non-computational concepts.	M S	2.48 .78	2.68 .74	2.42 .76	2.30 .77	2.48 .87
More diagnostic tests should be included in the Pupil's text.	M S	2.57 .73	2.57 .74	2.62 .72	2.57 .75	2.45 .74
Rather than the Chapter Review and Chapter Test in the Pupil's Edition, I would prefer one form in the Pupil's Edition and an alternate form as a secure test in the Teacher's Edition. (grades 3-8)	M S	2.50 .92	---	2.38 .91	2.61 .91	2.55 1.01

[1] Each statement was tabulated for every grade assignment (kindergarten through eighth grade) unless otherwise indicated.
[2] M=Response Mean; S=Standard Deviation.

TABLE 4

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content
for KINDERGARTEN TEACHERS

Questionnaire Item: How strongly do you agree or disagree with the following statements?
Scale Values: 4 (Strongly Agree), 3 (Agree), 2 (Disagree), 1 (Strongly Disagree).

Statement:	M[1] S	Kindergarten Teachers (N=10)
The inclusion of counting as far as 20 is appropriate for this level.	M S	3.44 .73
Provisions should be made in the book for writing numerals.	M S	3.33 1.00
Counting to numbers greater than 20 should be included.	M S	3.25 1.04
I regularly use the pre-text readiness activities in the front of the Teacher's Edition.	M S	2.88 .64
More coloring should be provided.	M S	2.22 .83

[1] M=Response Mean; S=Standard Deviation.

TABLE 5

HSM Field Research Study (1977–1978)
Teacher Questionnaire
Instructional Deisgn and Content
for FIRST and SECOND GRADE TEACHERS

Questionnaire Item: How strongly do you agree or disagree with the following statements?
Scale Values: 4 (Strongly Agree), 3 (Agree), 2 (Disagree), 1 (Strongly Disagree).

Statement:	M[1] S	First and Second Grade Teachers (N=51)
The presentation of mini-problems (short word problems with pictures) is an effective learning aid.	M S	3.43 .58
Grouping to tens helps primary children learn basic facts with sums greater than ten.	M S	3.24 .76
Time should be taught in one block with review throughout the year.	M S	3.21 .66
Pictures of blocks is an effective way to illustrate place value.	M S	3.14 .52
Teaching missing addends is an important part of a primary math program.	M S	2.83 1.05
The fraction form $\frac{1}{2}$, $\frac{1}{4}$, etc. should not be taught before grade 2.	M S	2.41 .93
The addition of two-digit numbers with regrouping should be taught before the addition of two-digit numbers WITHOUT regrouping.	M S	1.95 ..87

[1] M=Response Mean; S=Standard Deviation.

TABLE 6

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content
for THIRD and FOURTH GRADE TEACHERS

Questionnaire Item: How strongly do you agree or disagree with the following statements?
Scale Values: 4 (Strongly Agree), 3 (Agree), 2 (Disagree), 1 (Strongly Disagree).

Statement:	M[1] S	Third and Fourth Grade Teachers (N=52)
Each chapter should contain word problems based on previously taught skills rather than being limited to the new skills being introduced.	M S	3.48 .62
Time should be taught in one block with review throughout the year.	M S	3.21 .82
Telling time to the nearest minute should be included in grade 3.	M S	3.17 .71
Flow charts should be introduced at this level.	M S	2.59 .88
There should be more work with estimating.	M S	2.55 .86
Slides, flips and turns should be taught at this level.	M S	2.07 .90
Word problems should be based solely on the new skill being introduced in the chapter.	M S	1.89 .70

[1] M=Response Mean; S=Standard Deviation.

2. *Special Features of the HSM Teacher and Pupil Editions*

The responses made by the teachers concerning the special features of the HSM teacher and pupil editions are reported in Tables 7 and 8. These tables immediately follow Section II.B.2.

The teachers were asked which features of the *teacher's edition* they find valuable on a scale of 5 (Very Valuable) to 1 (Of Little Value). All the features of the teacher's edition received ratings which indicate that they are "very valuable" to "of moderate value" (Scale Value=3) to the teachers. These highly rated features are (in rank order):

	Teacher's Edition Feature:	*Total Response Mean*
a.	Listing Chapter Objectives	4.06
b.	Lesson Commentary: Listing of Objectives	4.04
c.	Chapter objectives keyed to test items (Grades 1-8)	3.98
d.	Lesson Commentary: Extra practice references (Grades 1-8)	3.94
e.	Lesson Commentary: Vocabulary	3.92
f.	Activity Reservoir	3.90
g.	Vocabulary lists for each chapter	3.88
h.	Cumulative (Final) Test (Grades 1-8)	3.86
i.	Lesson Commentary: Initial Activities	3.82
j.	Chapter background	3.72
k.	Problems of the Week (Grades 1-8)	3.65
l.	Lesson Commentary: Three Levels of Assignment (Grades 1-8)	3.48
m.	Lesson Commentary: Three Levels of Activities	3.45
n.	Teacher Commentary	3.42
o.	Bulletin Board Suggestions	3.38
p.	Scope and Sequence Charts	3.28

	Teacher's Edition Feature:	*Total Response Mean*
q.	A. V. keys to lesson	3.23
r.	Pacing Charts	3.23
s.	Reference Lists	3.01

Similarly, the teachers were asked which features of the *pupil's edition* they find valuable on a scale of 5 (Very Valuable) to 1 (Of Little Value). All the features of the pupil's edition were seen as "quite valuable" to "of moderate value" (Scale Value=3), namely (in rank order):

	Pupil's Edition Feature:	*Total Response Mean*
a.	Practice exercises (Grades 1-8)	4.47
b.	Keeping fit (Grades 1-6)/Tuning Up (Grades 7-8)	4.46
c.	Chapter Review (Grades 1-8)	4.37
d.	Check-Ups (Grades 1-8)	4.37
e.	Chapter Tests (Grades 1-8)	4.27
f.	Race Time (Grades 3-8)	3.91
g.	Activity Pages	3.85
h.	Brainteasers (Grades 3-8)	3.79
i.	Glossary (Grades 3-8)	3.50
j.	Table of Measures (Grades 3-8)	3.46
k.	Symbol List (Grades 3-8)	3.46
l.	Index (Grades 3-8)	3.41
m.	Career Awareness Pages	3.31
n.	Answers at the back of the text (Grades 3-8)	2.73

It is important to note that some feature items of both the teacher and pupil editions have large standard deviation scores indicating a lack of teacher evaluation consensus.

TABLE 7a

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Content and Design

Questionnaire Item: Which features in the HSM Teacher's Edition do you find valuable?
Scale Values: 5 (Very Valuable), 3 (Of Moderate Value), 1 (Of Little Value).

Statement:[1]	M[2] S	Teacher Total (N=181)	K through 2 Grade Teachers (n=61)	3rd & 4th Grade Teachers (n=52)	5th & 6th Grade Teachers (n=46)	7th & 8th Grade Teachers (n=22)
AS FOUND IN FRONT OF TEACHER'S EDITION:						
Scope and Sequence Charts	M	3.28	3.38	3.13	3.25	3.43
	S	1.03	.99	1.10	1.06	.87
Teacher's Commentary	M	3.42	3.43	3.27	3.58	3.38
	S	1.00	1.00	1.15	.89	.87
Reference Lists	M	3.01	3.33	2.76	3.00	2.71
	S	1.07	.93	1.08	1.15	1.10
Pacing Charts	M	3.23	3.42	3.00	3.27	3.15
	S	1.20	1.10	1.31	1.15	1.27
Activity Reservoir	M	3.90	4.12	3.79	3.89	3.57
	S	.88	.76	1.02	.85	.81
Problems of the Week (grades 1-8)	M	3.65	3.47	3.62	3.75	3.95
	S	.96	.95	1.07	.87	.81
Cumulative (Final) Test (grades 1-8)	M	3.86	3.85	3.60	4.17	3.80
	S	.98	.85	1.13	.85	1.06
CHAPTER OVERVIEW:						
Listing of Chapter Objectives	M	4.06	4.20	3.90	4.00	4.19
	S	.90	.81	.93	1.03	.68
Vocabulary Lists for each chapter	M	3.88	4.07	3.71	3.76	4.05
	S	.94	.81	.89	1.16	.81
Background	M	3.72	3.81	3.52	3.80	3.76
	S	.91	.85	.92	1.00	.83
Bulletin Board Suggestions	M	3.38	3.78	3.13	3.20	3.20
	S	1.11	.96	1.14	1.15	1.15

[1] Each feature was tabulated for every grade assignment (kindergarten through eighth grade) unless otherwise stated.
[2] M=Response Mean; S=Standard Deviation.

TABLE 7b

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content

Statement:	M S	Teacher Total (N=181)	K through 2 Grade Teachers (n=61)	3rd & 4th Grade Teachers (n=52)	5th & 6th Grade Teachers (n=46)	7th & 8th Grade Teachers (n=22)
LESSON COMMENTARY:						
Listing of Objectives	M S	4.04 .86	4.18 .77	3.92 .95	4.00 .87	4.00 .84
Vocabulary	M S	3.92 .80	3.98 .75	3.83 .81	3.89 .82	4.00 .84
Initial Activities	M S	3.82 .91	4.08 .82	3.69 1.03	3.70 .89	3.71 .78
A.V. keyed to lesson	M S	3.23 1.20	3.47 1.02	3.10 1.41	3.12 1.08	3.00 1.45
Three Levels of Activities	M S	3.45 1.14	3.37 1.12	3.16 1.27	3.76 .99	3.75 .97
Extra Practice references (Grades 1-8)	M S	3.94 .98	3.76 .98	3.88 1.13	4.09 .89	4.20 .70
Chapter objectives keyed to test items (Grades 1-8)	M S	3.98 .87	3.88 .85	3.92 .97	4.11 .90	4.05 .59
Three Levels of Assignment (Grades 1-8)	M S	3.48 1.15	3.53 .97	3.22 1.33	3.72 1.07	3.48 1.21

TABLE 8a

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content

Questionnaire Item: Which special features in the HSM Pupil's Edition do you find valuable?
Scale Values: 5 (Very Valuable), 3 (Of Moderate Value), 1 (Of Little Value).

Feature:[1]	M[2] S	Teacher Total (N=181)	K through 2 Grade Teachers (n=61)	3rd & 4th Grade Teachers (n=52)	5th & 6th Grade Teachers (n=46)	7th & 8th Grade Teachers (n=22)
Activity Pages	M	3.85	4.03	3.82	3.93	3.23
	S	.96	.89	1.01	.92	.92
Career Awareness Pages	M	3.31	3.14	3.22	3.40	3.73
	S	1.10	1.12	1.09	1.09	.99
Chapter Tests (Grades 1-8)	M	4.27	4.22	4.15	4.52	4.09
	S	.92	.87	1.11	.66	.97
Practice Exercises (Grades 1-8)	M	4.47	4.41	4.42	4.50	4.64
	S	.72	.67	.85	.66	.66
Check-Ups (Grades 1-8)	M	4.37	4.31	4.31	4.48	4.43
	S	.74	.68	.86	.62	.81
Keeping Fit (Grades 1-6)/ Tuning Up (Grades 7-8)	M	4.46	4.33	4.47	4.54	4.50
	S	.66	.68	.70	.62	.60
Table of Measures (Grades 3-8)	M	3.46	--	3.22	3.73	3.48
	S	.94		.92	.90	.98
Index (Grades 3-8)	M	3.41	--	3.20	3.65	3.41
	S	1.05		1.06	.95	1.14
Glossary (Grades 3-8)	M	3.50	--	3.29	3.76	3.45
	S	1.07		1.10	.97	1.14
Symbol List (Grades 3-8)	M	3.46	--	3.17	3.62	3.76
	S	1.06		1.06	.98	1.09
Chapter Review (Grades 3-8)	M	4.37	--	4.23	4.52	4.36
	S	.74		.88	.59	.66

[1] Each feature was tabulated for every grade assignment (kindergarten through eighth grade) unless otherwise stated.
[2] M=Response Mean; S=Standard Deviation.

TABLE 8b

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content

Feature:	M S	Teacher Total (N=181)	K through 2 Grade Teachers (n=61)	3rd & 4th Grade Teachers (n=52)	5th & 6th Grade Teachers (n=46)	7th & 8th Grade Teachers (n=22)
Answers at the back of the text (Grades 3-8)	M S	2.73 1.40	—	2.45 1.46	2.98 1.42	2.90 1.09
Brainteasers (Grades 3-8)	M S	3.79 1.04	—	3.92 1.15	3.74 .86	3.59 1.14
Race Time (Grades 3-8)	M S	3.91 1.06	—	3.96 1.08	3.91 1.02	3.76 1.14

3. *The Amount of Practice and Level of Difficulty of HSM Program Topics.*

The responses made by the teachers concerning the amount of practice and level of difficulty of HSM program topics are reported in Table 9. This table immediately follows Section II.B.3.

The teachers were asked to rate the amount of practice provided for specific program topics on a scale of 3 (Excessive) to 1 (Insufficient). In addition, for these same topics, the teachers were asked to rate the level of difficulty on a scale of 3 (Too Difficult) to 1 (Too Easy). In general, across grade assignment, teachers indicate that the amount of practice is "adequate" (Scale Value=2) and the level of difficulty is "appropriate" (Scale Value=2), for every listed topic, namely:

Topic:	*Total Response Means* *Amount of Practice*	*Level of Difficulty*
a. Geometry	1.97	2.01
b. Measurement	1.73	1.97
c. Length, area and volume	1.74	2.02
d. Missing addends (Grades 1-3)	1.81	2.12
e. Expanded form for renaming (Grades 1-6)	1.96	2.05
f. Whole number computation (Grades 1-8)	1.85	1.95
g. Metric System (Grades 1-8)	1.64	2.00
h. Probability (Grades 1-8)	1.94	2.13
i. Time (Grades 1-8)	1.61	2.03
j. Equations/Inequalities (Grades 1-8)	1.87	1.97
k. Place Value (Grades 1-8)	1.87	2.01
l. Number Line (Grades 1-8)	1.85	1.97
m. Fractions (Grades 3-8)	1.81	2.01
n. Long division algorithm (Grades 3-8)	1.83	2.05

	Topic:	Total Response Mean Amount of Practice	Total Response Mean Level of Difficulty
o.	Slides, flips, turns (Grades 5-8)	1.98	2.06
p.	Decimals (Grades 5-8)	1.84	1.95
q.	Map reading (Grades 5-8)	1.63	1.95
r.	Scale drawings (Grades 5-8)	1.80	1.98
s.	Integers (Grades 6-8)	1.82	1.94
t.	Percent (Grades 6-8)	1.79	2.03
u.	Ratio/Proportion (Grades 6-8)	1.66	2.00
v.	Graphs:		
	1. Pictograph (Grades 1-8)	1.83	1.96
	2. Bar (Grades 1-8)	1.79	1.97
	3. Line (Grades 5-8)	1.79	1.96
	4. Circle (Grades 6-8)	1.72	1.93

TABLE 9a

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content

Questionnaire Item: Please rate the amount of practice and level of difficulty for each topic.
Scale of Values for "Amount of Practice": 3 (Excessive), 2 (Adequate), 1 (Insufficient).
Scale of Values for "Level of Difficulty": 3 (Too Difficult), 2 (Appropriate), 1 (Too Easy).

Topic:[1]	M[2] S	Teacher Total (N=181)		K through 2 Grade Teachers (n=61)		3rd & 4th Grade Teachers (n=52)		5th & 6th Grade Teachers (n=46)		7th & 8th Grade Teachers (n=22)	
		Practice Amount	Diff. Level	Practice Amount	Diff. Level	Practice Amount	Diff. Level	Practice Amount	Diff. Level	Practice Amount	Diff. Level
geometry	M	1.97	2.01	1.84	1.91	1.88	1.92	2.12	2.13	2.05	2.12
	S	.48	.41	.44	.37	.45	.36	.50	.41	.51	.49
measurement	M	1.73	1.97	1.76	1.91	1.58	2.00	1.79	1.93	1.90	2.11
	S	.46	.33	.43	.29	.50	.40	.41	.26	.45	.32
length, area, volume	M	1.74	2.02	1.84	2.00	1.68	2.03	1.77	2.00	1.68	2.06
	S	.46	.40	.38	.56	.53	.42	.43	.27	.48	.42
missing addends (Grades 1-3)	M	1.81	2.12	1.76	2.19	1.88	2.00	--	--	--	--
	S	.72	.66	.46	.43	.26	.23				
expanding form for renaming (Grades 1-6)	M	1.96	2.05	1.86	2.10	1.98	2.07	2.02	2.00	--	--
	S	.39	.23	.42	.31	.44	.26	.27	.00		
whole number computation (Grades 1-8)	M	1.85	1.95	1.75	1.93	1.73	2.00	2.02	1.98	2.05	1.86
	S	.46	.24	.44	.26	.49	.21	.39	.15	.39	.36
metric system (Grades 1-8)	M	1.64	2.00	1.78	1.94	1.52	2.08	1.63	1.97	1.65	2.00
	S	.50	.32	.42	.25	.51	.42	.55	.18	.49	.33
probability (Grades 1-8)	M	1.94	2.13	1.80	2.09	1.89	2.09	2.07	2.17	1.86	2.14
	S	.37	.34	[illegible]	.30	.32	.29	.37	.38	.36	.36

[1] Each feature was tabulated for every grade assignment (kindergarten through eighth grade) unless otherwise indicated.
[2] M=Response Mean; S=Standard Deviation.

TABLE 9b

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content

Topic:	M S	Teacher Total (N=181) Practice Amount	Teacher Total (N=181) Diff. Level	K through 2 Grade Teachers (n=61) Practice Amount	K through 2 Grade Teachers (n=61) Diff. Level	3rd & 4th Grade Teachers (n=52) Practice Amount	3rd & 4th Grade Teachers (n=52) Diff. Level	5th & 6th Grade Teachers (n=46) Practice Amount	5th & 6th Grade Teachers (n=46) Diff. Level	7th & 8th Grade Teachers (n=22) Practice Amount	7th & 8th Grade Teachers (n=22) Diff. Level
time (Grades 1-8)	M	1.61	2.03	1.59	2.10	1.46	2.05	1.83	1.96	1.83	1.91
	S	.49	.39	.50	.43	.50	.47	.38	.19	.39	.30
equations/inequalities (Grades 1-8)	M	1.87	1.97	1.94	1.94	1.92	2.00	1.88	2.03	1.71	1.85
	S	.36	.21	.24	.25	.35	.00	.33	.16	.46	.37
place value (Grades 1-8)	M	1.87	2.01	1.86	2.00	1.78	2.07	1.93	1.97	1.95	2.00
	S	.41	.24	.35	.32	.51	.26	.41	.16	.22	.00
number line (Grades 1-8)	M	1.85	1.97	1.77	2.02	1.89	1.92	1.92	1.94	1.81	2.00
	S	.43	.24	.52	.16	.38	.27	.27	.24	.41	.32
fractions (Grades 3-8)	M	1.81	2.01	--	--	1.86	2.03	1.84	2.00	1.67	2.00
	S	.44	.30			.42	.17	.42	.31	.48	.44
long division'algorithms (Grades 3-8)	M	1.83	2.05	--	--	1.68	2.14	1.87	2.00	1.95	2.05
	S	.41	.32			.56	.57	.34	.00	.23	.23
slides, flips, turns (Grades 5-8)	M	1.98	2.06	--	--	--	--	1.97	2.03	2.00	2.13
	S	.37	.31					.37	.30	.37	.34
decimals (Grades 5-8)	M	1.84	1.95	--	--	--	--	1.89	2.00	1.75	1.86
	S	.37	.28					.31	.23	.44	.35
map reading (Grades 5-8)	M	1.63	1.95	--	--	--	--	1.61	1.92	1.67	2.00
	S	.49	.31					.49	.34	.49	.00

TABLE 9c

HSM Field Research Study (1977–1978)
Teacher Questionnaire
Instructional Design and Content

Topic:	M S	Teacher Total (N=181) Practice Amount	Teacher Total (N=181) Diff. Level	K through 2 Grade Teachers (n=61) Practice Amount	K through 2 Grade Teachers (n=61) Diff. Level	3rd & 4th Grade Teachers (n=52) Practice Amount	3rd & 4th Grade Teachers (n=52) Diff. Level	5th & 6th Grade Teachers (n=46) Practice Amount	5th & 6th Grade Teachers (n=46) Diff. Level	7th & 8th Grade Teachers (n=22) Practice Amount	7th & 8th Grade Teachers (n=22) Diff. Level
scale drawings (Grades 5–8)	M	1.80	1.98	—	—	—	—	1.87	2.00	1.68	1.94
	S	.41	.26					.35	.27	.48	.24
integers (Grades 6–8)	M	1.82	1.94	—	—	—	—	1.93	2.07	1.74	1.85
	S	.39	.34					.26	.26	.45	.37
percent (Grades 6–8)	M	1.79	2.03	—	—	—	—	1.93	2.00	1.68	2.05
	S	.42	.39					.27	.00	.48	.52
ratio/proportion (Grades 6–8)	M	1.66	2.00	—	—	—	—	1.86	2.00	1.52	2.00
	S	.48	.37					.36	.00	.51	.49
graphs											
1) bar (Grades 1–8)	M	1.79	1.97	1.86	2.00	1.76	2.00	1.83	1.97	1.67	1.88
	S	.41	.16	.36	.00	.44	.00	.38	.18	.49	.33
2) pictograph (Grades 1–8)	M	1.83	1.96	1.91	1.97	1.73	1.97	1.88	1.97	1.76	1.93
	S	.38	.19	.29	.18	.45	.19	.33	.18	.44	.26
3) line (Grades 5–8)	M	1.79	1.96	—	—	—	—	1.82	2.00	1.72	1.88
	S	.41	.20					.39	.00	.46	.33
4) circle (Grades 6–8)	M	1.72	1.93	—	—	—	—	1.79	1.92	1.67	1.94
	S	.46	.26					.43	.29	.49	.24

4. *The Amount of Emphasis Specific Mathematics Applications Should Receive in the HSM Program.*

The responses made by the teachers concerning the amount of emphasis specific applications should receive in the HSM program are reported in Table 10. This table immediately follows Section II.B.4.

The teachers were asked how much emphasis they would like to have specific applications receive in the HSM program on a scale of 3 (Stronger) to 1 (Weaker). In general, the teachers report that the following applications should be maintained at the present HSM © 1978 program emphasis (in rank order):

	Application	*Total Response Mean*
a.	Computation with metric units (Grades 3-8)	2.46
b.	Changing units within the metric system (Grades 2-8)	2.34
c.	Units of Time (Grades 1-8)	2.34
d.	Geometry:	
	1. Finding areas and volumes (Grades 3-8)	2.18
	2. Number relation within figures (i.e. perimeters) (Grades 3-8)	2.18
	3. Recognizing figures and their parts	2.16
	4. Finding linear measures of figures (Grades 1-8)	2.16
	5. Definition of planes, etc. (Grades 6-8)	2.09
e.	Compass constructions (Grades 4-8)	2.04
f.	Precision in measurement (Grades 6-8)	1.97
g.	Significant digits (Grade 8)	1.93

The teachers respond that the stacking method of division (Grades 3-6) should receive a weaker emphasis ($\bar{x}$=1.47) in the HSM program.

TABLE 10

HSM Field Research Study (1977-1978)
Teacher Questionnaire
Instructional Design and Content

Questionnaire Item: How much emphasis would you like to have the following applications receive in the HSM program?
Scale Values: 3 (Stronger), 2 (Same as in the '78 edition), 1 (Weaker).

Application:[1]	M[2] S	Teacher Total (N=181)	K through 2 Grade Teachers (n=61)	3rd & 4th Grade Teachers (n=52)	5th & 6th Grade Teachers (n=46)	7th & 8th Grade Teachers (n=22)
Units of time (Grades 1-8)	M	2.34	2.44	2.46	2.19	2.13
	S	.51	.56	.51	.40	.50
Changing units within the metric system (Grades 2-8)	M	2.34	2.43	2.17	2.41	2.53
	S	.61	.54	.66	.55	.61
Stacking method of division (Grades 3-6)	M	1.47	--	1.42	1.51	--
	S	.59		.62	.55	
Computation with metric units (Grades 3-8)	M	2.46	--	2.37	2.51	2.53
	S	.50		.49	.51	.51
Compass constructions (Grades 4-8)	M	2.04	--	2.09	2.05	2.00
	S	.49		.54	.45	.58
Precision in measurement (Grades 6-8)	M	1.97	--	--	2.13	1.84
	S	.72			.52	.83
Significant digits (Grade 8)	M	1.93	--	--	--	1.93
	S	.70				.70
Geometry						
Recognizing figures and their parts	M	2.16	2.26	2.21	1.98	2.32
	S	.52	.45	.42	.60	.58
Finding linear measure of figures (Grades 1-8)	M	2.16	2.42	2.11	2.05	2.32
	S	.55	.52	.45	.61	.58
Finding areas and volumes (Grades 3-8)	M	2.18	--	2.03	2.14	2.53
	S	.59		.52	.63	.51
Number relations within figures (i.e. perimeters) (Grades 3-8)	M	2.18	--	2.07	2.08	2.56
	S	.58		.47	.63	.51
Definition of planes, etc. (Grades 6-8)	M	2.09	--	--	1.93	2.22
	S	.64			.48	.73

[1] Each feature was tabulated for every grade assignment (kindergarten through eighth grade) unless otherwise stated.
[2] M=Response Mean; S=Standard Deviation.

III. Discussion:

A questionnaire was distributed to teachers whose schools were participating in the HOLT SCHOOL MATHEMATICS Field Study (1977-1978). The following is a summary of the key findings as reported by the respondents (N=181) concerning the HSM program (1978 Edition):

A. The teachers agree that the 3-part approach of the HSM lessons (Display-Development-Drill) is effective with their students.

B. The teachers indicate that all the general features of the HSM program are "Good" to "Very Good." The features receiving the highest ratings include: attractiveness of the text, ease of use, material racially and sexually balanced, maintenance of skills, and reading levels.

C. The teachers report that all special features of the teacher and pupil editions are very valuable to of moderate value. The features of the teacher's edition which received the highest ratings include: chapter and lesson commentary objectives, and chapter objectives keyed to test items. The features of the pupil's edition which received the highest ratings include: practice exercises, "Keeping Fit/Tuning Up," chapter review and chapter tests, and "Check-Ups."

D. In general, across grade assignment, teachers indicate that the amount of practice is "adequate" and the level of difficulty is "appropriate" for every listed topic. It should be noted that the teachers report various topics should receive greater emphasis in the HSM program. In grades 3 and 4 a percentage of teachers reported that time (50%), the metric system (44%) and measurement (40%) should receive greater emphasis, while in grades 7 and 8, the teachers (46%) indicated ratio and proportion should receive greater emphasis.

E. Generally, the teachers report that they would prefer the present emphasis of listed mathematics applications in the HSM program to be maintained at the present HSM © 1978 program emphasis with the exception of the stacking method of division (Grades 3-6) which teachers report should receive a weaker emphasis.

STUDY PHASE: ON-SITE STUDENT INTERVIEWS

Research Report: The HOLT SCHOOL MATHEMATICS Program © 1978
(HSM) Field Study (1977-1978)
Study Phase: On-Site Student Interviews

I. Statement of Purpose/Methodology:

Holt, Rinehart and Winston (School Department) sought to investigate the reaction of students to specific exercises and features of the HOLT SCHOOL MATHEMATICS © 1978 program. For this purpose, a questionnaire was designed for the students which would meet the following objectives:

A. To assess the characteristics of the student sample completing the questionnaire.

B. To assess the level of students' understanding of the career feature in their pupil's edition.

C. To assess the students' judgments regarding specific exercises (e.g. Activities, Mini-Problems, "Brainteasers," etc.) in their pupil's edition.

D. To assess the students' level of interest for the photographs and illustrations found in their pupil's edition.

Two questionnaires[1] were employed with students from five representative school sites employing the HOLT SCHOOL MATHEMATICS program. The questionnaires were orally administered to students by on-site interviewers. The student sample (N=339) included second grade students (n=132) completing HOLT SCHOOL MATHEMATICS Level 2, fourth grade students completing HOLT SCHOOL MATHEMATICS Level 4 (n=77) and seventh grade students completing HOLT SCHOOL MATHEMATICS Level 7 (n=130).

II. Results:

A. General School Information

In rank order, the students are thus represented by national geographic region: Eastern Region (n=35%), Western Region (25%), Atlantic Region (24%) and Pacific Region (16%). The profile of the students' schools are varied in terms of the type of school community, total school population and the estimated family income of the students, as demonstrated by the following table:

[1] One questionnaire form was developed for Level 2 students and another form was developed for both Level 4 and 7 students.

TABLE 1

PROFILE OF PARTICIPATING SCHOOLS
(On-Site Student Interviews)

Geographic Region	Community	School Grades	Total School Population	Estimated Family SES*
Eastern	Large City	K-8	280	Middle
Atlantic	Suburb	K-5	374	Middle
Atlantic	Suburb	6-8	997	Low to Middle
Western	Large City	K-6	250	Middle
Pacific	Rural	2-3	300	Middle

*Estimated Socio-Economic Background of family in accordance with the U.S. Department of Commerce-Bureau of the Census (1977 report).

B. Students' Reaction to the Career Features in the HOLT SCHOOL MATHEMATICS Program.

In regard to the career features in their pupil's edition, students were asked if they thought it was a "good idea" to have stories about adult occupations in their mathematics pupil's edition. As a total, the students report that the career stories are an important feature. Their responses to why the career feature is important to them demonstrate a clear understanding of the objectives of the career features. In their own words, they commonly state these objectives as:

- "To learn about different jobs so that we can choose a career when we grow up."
- "To help us be more interested in our math work."
- "To learn the relationship of different jobs to math problems."
- "To show us that math is in everything we do; we use it in all kinds of work."

C. Students' Judgments Concerning the Exercises/Illustrations in their HOLT SCHOOL MATHEMATICS Pupil's Edition.

1. Responses of HOLT SCHOOL MATHEMATICS Level 2 Students.

a. Activity & Mini-Problem Exercises.

Students employing HOLT SCHOOL MATHEMATICS Level 2 were shown by the interviewers several activity and mini-problem exercises from their pupil's edition. The students were asked if they generally tried to solve these exercises during mathematics instruction. Moreover, they were asked if they preferred the activities to the "regular" pupil's edition exercises and if they found the mini-problems to be at an appropriate level of difficulty. Almost all of the students indicate that they did the activities and the mini-problems as they occur in the lessons (97% and 99% respectively). Approximately 51% of the students indicate a preference for activities to regular pupil's edition exercises. Some 71% of the students indicate that the mini-problems are "about right" in level of difficulty.

b. Favorite PE Exercises.

The students were then asked about various exercises in their pupil's edition. In rank order, they report the most interesting are: "Connect the Dots" (48%), "Magic Machine" (36%) and "Number Puzzles" (16%).

c. Practice.

The students were asked if they generally understood the material after they had been taught a new lesson by their teacher and had completed the exercises in their pupil edition. Over 88% of the students report that they usually understand the material after teacher instruction and exercise practice. Approximately, 62% of the students indicate, however, that they would *like* more mathematics practice, particularly in multiplication and renaming in subtraction.

d. Illustrations.

Finally, the students were asked about the amount of coloring and the kinds of illustrations in their pupil's edition. Some 46% of the students report that they would like more coloring, 40% felt there is enough coloring and 14% indicate that they would like less coloring in their pupil's edition. When asked to indicate their favorite pictures in their pupil's edition, the students most frequently select cartoons (22%) and illustrations of animals (20%). In regard to cartoons, the students specifically cite the "big green bird" as their favorite. Moreover, the students often choose the "big pink pigs" on page 284 of their pupil's edition as the most enjoyable animal illustration.

2. *Responses of HOLT SCHOOL MATHEMATICS Level 4 and 7 Students.*

a. *Activity and "Brainteaser" Exercises.*

Students employing HOLT SCHOOL MATHEMATICS Levels 4 and 7 were asked if they generally tried to solve the activity exercises and if so, did they prefer the activities to "regular" exercises. Moreover, the students were asked if they generally tried to solve the "Brainteaser" problems and if so, did they find these problems to be at the appropriate level of difficulty.

Some 78% of the Level 4 students indicate that they do the activities as they occur in the lessons. Approximately 59% of these students indicate a preference for activities to "regular" pupil's edition exercises. Some 70% of the Level 4 students report that they generally try the "Brainteaser" problems and 50% of these students think that these problems are "too hard."

Only 43% of the Level 7 students report that they generally try to do the activity exercises in their pupil's edition, but 60% of these students prefer the activities to the regular exercises. Approximately 64% of the Level 7 students indicate that they usually try to answer the "Brainteaser" problems. These students are of differing judgments as to whether the "Brainteasers" are "too hard" (49%) or "about right" (49%) in level of difficulty.

b. *Flow Charts.*

In addition, Level 4 and 7 students were also required to demonstrate a general understanding of flow charts by verbally answering questions posed by the interviewers.[2] It should be noted that many students (particularly Level 4 students) commented that they had not as yet been instructed on the use of flow charts. Some 72% of Level 4 students and 88% of Level 7 students, however, were able to demonstrate a general understanding of flow charts. Indeed, several Level 7 students did comment that they had found flow charts particularly helpful in learning to bisect angles during class instruction.

c. *Practice.*

Level 4 and 7 students were asked if they generally understood the material after they had been taught a new lesson by their teacher and had completed the exercises in their pupil edition. Some 91% of Level 4 students report that they usually understand the material after teacher instruction and exercise practice. Approximately 70% of the

[2] An example of a question posed by interviewers to Level 7 students was "On page 95, the question 'Do the two arcs intersect?' arises. According to the flow chart, what must be done if the two arcs *do* intersect?" Similar questions were posed to both Level 4 and 7 students involving other flow chart examples from their HOLT SCHOOL MATHEMATICS program.

students indicate, however, that they would *like* more mathematics practice particularly in the areas of multiplication, fractions and division. Similarly, over 93% of Level 7 students report that they generally understand the new materials after instruction and practice. Approximately 68% of Level 7 students state that they would not find additional practice exercises to be of aid. Some 32%, however, report that they would *like* more practice, particularly in geometry (21%). It should be noted that several Level 7 students did comment that they would find "display" (i.e. model) examples to illustrate the more difficult exercises of the lessons' objectives very beneficial.

d. Answer Section.

When asked if they ever used the answer section in their pupil's edition, 71% of Level 4 students report that they do not use this section for any purpose. Approximately 52% of the Level 7 students, however, report that they do use the answer section in order to "check" their answers or as an aid in deducing the preliminary steps to answers.

e. Chapter Reviews.

Level 4 and 7 students were asked if they generally use the chapter reviews, and if so, how the chapter reviews helped them in their understanding of mathematics. The students, overwhelmingly, report that they do generally use the chapter reviews (Level 4, 94%; Level 7, 95%) and that the chapter reviews help the students to find out which lessons they need to study more (Level 4, 83%; Level 7, 97%).

f. Illustrations.

Finally, the students were asked about their favorite illustrations/photographs in their pupil's edition. In rank order, Level 4 students report that they most strongly prefer the animal illustrations (43%), the cartoons (18%) and the photographs (11%). Level 7 students report a preference for photographs (24%) and cartoons (23%). It should be noted that 15% of Level 7 students did comment that the illustrations (particularly the "comic caption" pictures commonly in the "display" area of the lessons) are "too babyish." These students suggest that photographs be substituted and in general, more diagrams and charts be included in the pupil's edition.

III. Discussion:

Questionnaires were developed to investigate via on-site interviews the reaction of students to specific exercises and features of the HOLT SCHOOL MATHEMATICS © 1978 program. The students were from five schools participating in the HOLT SCHOOL MATHEMATICS Field Study (1977-1978). The following is a summary of the key findings as reported by the respondents (N=339) concerning the HOLT SCHOOL MATHEMATICS program:

A. Across grade level, students report that they generally understand the program material after teacher instruction and exercise practice (Level 2 students, 88%; Level 4 students, 91%; Level 7 students, 93%). Some Level 2 students state that they would like more practice in multiplication and renaming in subtraction, Level 4 students in multiplication, fractions and division, and Level 7 students in geometry.

B. The students indicate that the career feature in their pupil's edition is important to their learning and that they clearly understand its objectives.

C. With increasing grade level, the students report that they less frequently do the "activity" section of their HSM program (Level 2 students, 97%; Level 4 students, 78%; Level 7 students, 43%).

D. Level 2 students indicate that they answer the pupil's edition mini-problems which they evaluate as "about right" in difficulty (71%). Level 2 students indicate that "Connect the Dots" is a favorite type of exercise for them.

E. Level 4 and 7 students report that they generally try to do the "Brainteaser" problems (Level 4 students, 70%; Level 7 students, 64%). Level 4 students tend to regard these problems as too difficult (59%). Level 7 students differ in their evaluation as to whether these problems are "about right" (49%) or "too difficult" (49%) for them.

F. Some 72% of Level 4 students and 88% of Level 7 students were able to demonstrate a general understanding of flow charts.

G. Only 29% of Level 4 students and 52% of Level 7 students report that they ever use the answer section in their pupil's edition.

H. The students report that they do generally use chapter reviews (Level 4, 94%; Level 7, 95%) and that the chapter reviews help them to find out which lessons they need to study more (Level 4, 83%; Level 7, 97%).

I. Across grade level, students report a preference for cartoon illustrations in their pupil's edition. Level 2 and 4 students also indicate a preference for animal illustrations, whereas Level 7 students cite a preference for photographs, diagrams, and charts.

STUDY PHASE: PRE/POST ANALYSIS OF STUDENTS' ACHIEVEMENT IN MATHEMATICS SKILLS

Research Report: The HOLT SCHOOL MATHEMATICS (HSM)
Field Study (1977-1978)
Study Phase: Pre/Post Analysis of Students' Achievement in Mathematics Skills

I. Statement of Purpose/Methodology:

Holt, Rinehart and Winston (School Department) sought to investigate students' achievement growth in mathematics during their first year of instruction with the HOLT SCHOOL MATHEMATICS © 1978 program. In order to evaluate student achievement on specific mathematics objectives the Diagnostic Mathematics Inventory (DMI) © 1975, 1977, published by CTB/McGraw-Hill, was selected for the HSM Field Study. In the development of this criterion-referenced test, scores from the DMI were correlated with scores on the California Achievement Test-Form C, which was administered along with the DMI to a national norm group. Hence, estimated normative scores can be generated from students' DMI scores. This DMI design feature insured that the performance of students participating in the HSM Field Study would be realistically compared with that of their contemporaries.

The pre and post-testing of the DMI was conducted in 27 school sites throughout the country which used the HSM © 1978 program. Students in grades two through eight were tested with this instrument in October of 1977 and again in May of 1978. Students in grade one were tested only in May of 1978. The results of the testing phase presented in this report reflect the achievement growth in mathematics of students for whom there were *both* pre and post-test measures (N=3890). Assuredly, the total number of students tested per grade was larger than the number of students for whom there were matched test measures, due to such factors as student mobility and health. An analysis which employed, however, only matched pre and post-test scores of students was seen as the most efficient method to assess the impact of a full year's instruction with the HSM program on students' achievement in mathematics.

II. Results:

A. General Information.

General information concerning the schools which participated in the pre/post analysis of the Diagnostic Mathematics Inventory-CTB/McGraw-Hill are presented in Table 1. (This table immediately follows Section I.A.)

In rank order, the school sites (N=27) are thus represented by national geographic region: the Midwestern Region (n=10), the Eastern Region (n=7), the Western Region (n=6), and the Pacific Region (n=4). The schools are quite varied in their description in terms of the type of school community, the total school population and the estimated family income of the students.

The total number of students for whom there were *both* pre and post-test measures are, by grade, as follows: first grade (n=366), second grade (n=721), third grade (n=649), fourth grade (n=432), fifth grade (n=560), sixth grade (n=353), seventh grade (n=416) and eighth grade (n=393).

TABLE 1a

HSM Field Research Study (1977-1978)
PROFILE OF SCHOOLS PARTICIPATING IN THE PRE/POST ANALYSIS OF THE
Diagnostic Mathematics Inventory © 1977 (CTB/McGraw-Hill)

Geographic Region	School Community	School Grades	Total School Population	Estimated Family SES*	Grades Participating in HSM Study
Eastern	Large City	K-8	280	Middle	1-8
Eastern	Large City	K-6	900	Low to Middle	4-6
Eastern	Suburb	6-8	970	Middle	7-8
Eastern	Small City	K-6	425	Middle	1-6
Eastern	Small City	K-5	453	Middle	1-5
Eastern	Small City	K-5	650	Middle	1-5
Eastern	Rural	6-8	600	Middle	6,8
Midwestern	Small City	K-6	446	Middle to Upper	1-6
Midwestern	Small City	K-6	515	Middle to Upper	3,6
Midwestern	Small City	K-6	300	Low to Middle	5
Midwestern	Small City	K-6	356	Middle	4
Midwestern	Small City	K-6	176	Low to Middle	2
Midwestern	Small City	K-6	311	Low to Middle	1
Midwestern	Small City	K-6	260	Low to Middle	6
Midwestern	Small City	K-6	576	Low to Middle	3
Midwestern	Small City	K-6	357	Low to Middle	2
Midwestern	Small City	K-6	360	Low to Middle	1

*Estimated Socio-Economic Background of family in accordance with the 1977 report of the U.S. Dept. of Commerce-Bureau of the Census.

TABLE 1b

HSM Field Research Study (1977-1978)
PROFILE OF SCHOOLS PARTICIPATING IN THE PRE/POST ANALYSIS OF THE Diagnostic Mathematics Inventory © 1977 (CTB/McGraw-Hill)

Geographic Region	School Community	School Grades	Total School Population	Estimated Family SES*	Grades Participating in HSM Study
Western	Large City	K-6	250	Middle	1
Western	Large City	7-12	130	Middle	7,8
Western	Suburb	K-5	520	Middle to Upper	4
Western	Rural	K-12	462	Middle	1-4,7,8
Western	Rural	K-4	378	Middle to Upper	1-3
Western	Rural	K-12	990	Middle	5
Pacific	Small City	6-8	455	Low to Middle	6-8
Pacific	Small City	4-5	393	Low to Middle	4,5
Pacific	Small City	K-5	850	Middle	1-5
Pacific	Rural	2-3	300	Middle	2,3

*Estimated Socio-Economic Background of family in accordance with the 1977 report of the U.S. Department of Commerce-Bureau of the Census.

B. Pre/Post Analysis of the Diagnostic Mathematics Inventory (DMI).

An estimated norm-referenced pre and post quartile distribution analysis was conducted for each grade to interpret the matched pre and post-test assessments of the students' achievement in computation and mathematical concepts and applications. In addition, mean pre/post grade equivalency scores were assessed for student grade levels. (Tables 2 and 3 immediately follow Section II.B.)

In general, an examination of the changes in pre and post distributions indicate that there is indeed a large movement of students to higher national quartiles on the post administration of the DMI. Thus, for example on the pre-test of the DMI (mathematics total) 47% of the sixth grade students placed within the top fifty percent of the nation for their grade level. On the administration of the post-test, 76% of these students placed within the top fifty percent of the nation, an increase of 29%.

TABLE 2a.

HSM Field Research Study (1977-1978)
Quartile Distribution Summary
of Pre and Post-Test Scores

Diagnostic Mathematics Inventory © 1977 (CTB/McGraw-Hill)
Estimated Normative Scores

GRADE 1
Number of Students=366

National Percentiles in Quartile Format	Math Computation		Math Concepts and Applications		Math Total	
	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students
76-99	---	54	---	54	---	56
51-75	---	28	---	29	---	27
26-50	---	13	---	14	---	13
1-25	---	5	---	3	---	4

TABLE 2b.

GRADE 2

Number of Students=721

National Percentiles in Quartile Format	Math Computation		Math Concepts and Applications		Math Total	
	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students
76-99	39	43	34	53	38	53
51-75	26	29	23	25	26	24
26-50	21	17	23	15	20	15
1-25	14	11	20	7	16	8

TABLE 2c.

HSM Field Research Study (1977-1978)
Quartile Distribution Summary
of Pre and Post-Test Scores

Diagnostic Mathematics Inventory © 1977 (CTB/McGraw-Hill)
Estimated Normative Scores

GRADE 3
Number of Students=649

National Percentiles in Quartile Format	Math Computation		Math Concepts and Applications		Math Total	
	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students
76-99	47	53	35	51	45	52
51-75	25	22	23	23	24	23
26-57	13	17	23	18	16	17
1-25	15	8	19	8	15	8

TABLE 2d.

GRADE 4
Number of Students=432

National Percentiles in Quartile Format	Math Computation		Math Concepts and Applications		Math Total	
	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students
76-99	38	55	38	53	44	56
51-75	33	20	29	23	33	22
26-50	17	17	22	15	14	15
1-25	12	8	11	9	9	7

TABLE 2e.

HSM Field Research Study (1977-1978)
Quartile Distribution Summary
of Pre and Post-Test Scores

Diagnostic Mathematics Inventory © 1977 (CTB/McGraw-Hill)
Estimated Normative Scores

GRADE 5
Number of Students=560

National Percentiles in Quartile Format	Math Computation		Math Concepts and Applications		Math Total	
	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students
76-99	37	65	38	63	41	64
51-75	29	17	30	21	30	19
26-50	24	13	20	11	19	11
1-25	10	5	12	5	10	6

TABLE 2f.

GRADE 6
Number of Students=353

National Percentiles in Quartile Format	Math Computation		Math Concepts and Applications		Math Total	
	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students
76-99	17	39	17	34	17	35
51-75	28	38	27	40	30	41
26-50	29	13	30	17	27	15
1-25	26	10	26	9	26	9

TABLE 2g.

HSM Field Research Study (1977-1978)
Quartile Distribution Summary
of Pre and Post-Test Scores

Diagnostic Mathematics Inventory © 1977 (CTB/McGraw-Hill)
Estimated Normative Scores

GRADE 7
Number of Students=416

National Percentiles in Quartile Format	Math Computation		Math Concepts and Applications		Math Total	
	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students
76-99	26	56	26	47	28	54
51-75	38	25	37	34	37	28
26-50	24	14	28	14	27	13
1-25	12	5	9	5	8	5

TABLE 2h.

GRADE 8
Number of Students=393

National Percentiles in Quartile Format	Math Computation		Math Concepts and Applications		Math Total	
	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students	Pre-Test Percent of Students	Post-Test Percent of Students
76-99	28	48	28	47	31	47
51-75	33	28	38	32	34	31
26-50	25	14	24	13	25	13
1-25	14	10	10	8	10	9

TABLE 3.

HSM Field Research Study (1977-1978)

Mean Grade Equivalency Pre and Post-Test Scores[1]

Diagnostic Mathematics Inventory © 1977 (CTB/McGraw-Hill)
Estimated Normative Scores

Grade	Number of Students	Math Computation		Math Concepts and Applications		Math Total	
		Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
1	366	– – –	2.3	– – –	2.5	– – –	2.4
2	721	2.4	3.2	2.4	3.7	2.4	3.4
3	649	3.3	4.6	3.4	4.9	3.4	4.7
4	432	4.5	5.9	4.8	6.0	4.8	6.0
5	560	5.7	7.9	5.9	8.3	5.9	8.0
6	353	5.8	7.7	5.9	7.7	6.0	7.7
7	416	7.5	9.7	7.7	9.3	7.7	9.4
8	393	9.2	10.7	9.1	10.5	9.1	10.5

[1]Students were pre-tested in October of 1977 and post-tested in May of 1978.

III. Discussion:

The Diagnostic Mathematics Inventory, published by CTB/McGraw-Hill, was administered to 27 school sites throughout the country which had used the HSM © 1978 program. Students were pre-tested with this measure in October of 1977 and post-tested in May of 1978. The results of this testing phase reflect the achievement growth in mathematics of students for whom there were *both* pre and post-test measures. The students (N=3890) were tested in the first through eighth grades.

After a school year of instruction with the HOLT SCHOOL MATHEMATICS Program there was a large movement of students to higher national quartiles in mathematics achievement.

IMPLICATIONS OF THE STUDY FOR PROGRAM DEVELOPMENT

Research Report: The HOLT SCHOOL MATHEMATICS (HSM)
Field Study (1977-1978)

IMPLICATIONS OF THE STUDY FOR PROGRAM DEVELOPMENT

The results of the HOLT SCHOOL MATHEMATICS Field Study (1977-1978) have indicated important implications for program development.

Implication 1: Teachers are strongly supportive of the 3-part approach of the HSM lessons (Display-Development-Drill).

Implication 2: In general, the majority of teachers indicate that the amount of practice is "adequate" for every listed HSM topic. There were, however, teachers who reported that some areas of the program should include more practice (e.g. the metric system and measurement). Moreover, the teachers reported that the stacking method of division (Grades 3-6) should receive a weaker emphasis. These specific areas will be further explored in a follow-up study to be conducted in the spring of 1979.

Implication 3: Pre/Post analysis of student achievement in mathematics indicated that there was a large movement of students to higher national quartiles on the post administration of the Diagnostic Mathematics Inventory (via estimated normative scores). An examination of the DMI assessment by each inventory criterion for every grade level (Grade 1 through 8) has provided specific and valuable information in understanding student achievement for each skill objective.

Implication 4: The HSM Field Study (1977-1978) has provided a viable model for program evaluation. A similar model will be used in the forthcoming HSM Field Study (Spring, 1979).

APPENDIX

Participating Schools
in the HSM Field Research Study (1977-1978)

We strongly appreciate the cooperation of the following schools for participating in most, if not all, of the phases of the HOLT SCHOOL MATHEMATICS Field Research Study during the 1977-1978 school year:

M. E. Post School
Yuma, Arizona

R. Pete Woodard Junior High School
Yuma, Arizona

Wheeling Elementary School
Aurora, Colorado

Lewis Palmer Middle School
Monument, Colorado

Adams County District No. 12
Eastlake Elementary School
Leroy Elementary School
Northeast Junior High School
North Glenn, Colorado

Yuma West Middle School
Yuma, Colorado

Downes Elementary School
Newark, Delaware

Lindley Middle School
Mableton, Georgia

Riverside Elementary School
Mableton, Georgia

Belmont Hills Elementary School
Smyrna, Georgia

Central Elementary School
Jerome, Idaho

Jefferson Elementary School
Jerome, Idaho

Nativity of Our Savior School
Portage, Indiana

Albert City-Truesdale School
Albert City, Iowa

Garner Elementary School
Garner, Iowa

Indian Creek Elementary School
Marion, Iowa

Christian Challenge School
Wichita, Kansas

Leeds Central School
Leeds, Maine

Lorange Junior High School
Old Orchard Beach, Maine

New Bedford Junior High School
New Bedford, Massachusetts

Roosevelt Junior High School
New Bedford, Massachusetts

Crary Junior High School
Pontiac, Michigan

Independent School District No. 181
Baxter Elementary School
Garfield Elementary School
Harrison Elementary School
Lowell School
Misswa School
Whittier Elementary School
Brainerd, Minnesota

Elmwood Grade School
Elmwood, Illinois

Sweeney School
Shakopee, Minnesota

Gordon McCaw School
Henderson, Nevada

C. H. Decker Elementary School
Las Vegas, Nevada

C. Woodbury Senior High School
Las Vegas, Nevada

Gilford Elementary School
Laconia, New Hampshire

Arthur Rann School
Absecon, New Jersey

Oceanville School
Oceanville, New Jersey

P.S. 284
Brooklyn, New York

St. Clement Pope School
South Ozone Park, New York

Heim Middle School
Williamsville, New York

St. Joseph School
Williston, North Dakota

Massillon City Schools
Emerson Elementary School
Gorrell Elementary School
Harvey Elementary School
L. E. York School
Lincoln Elementary School
Whittier Elementary School
Massillon, Ohio

Third Ward School
Bradford, Pennsylvania

Ashley Elementary School
Vernal, Utah

Central Elementary School
Vernal, Utah

Maeser Elementary School
Vernal, Utah

Canyon Park Junior High School
Bothell, Washington

Clear Lake Elementary School
Clear Lake, Wisconsin